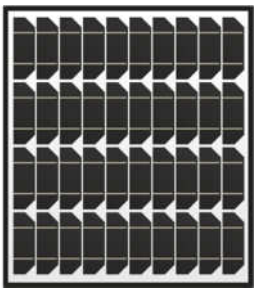
VERSION 2.1

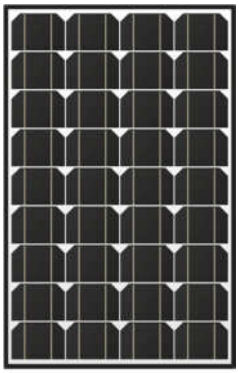
INSTALLATION MANUAL

MONOCRYSTALLINE MODELS

40 Watt – 50042



65 Watt – 50062



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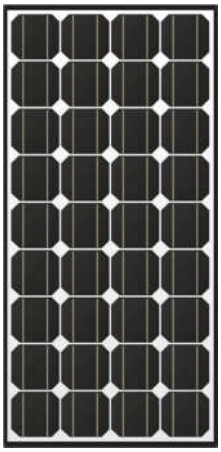

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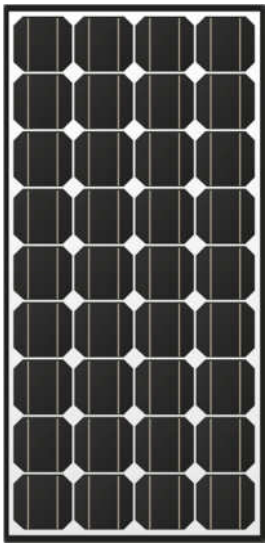
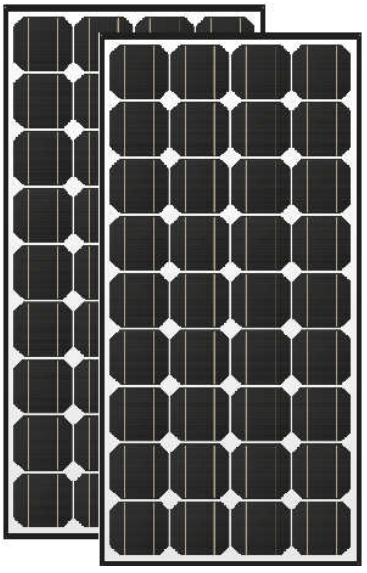


280 Watt - 50262



Please Read Instruction Manual before Operating

Thank you for purchasing your Nature Power Monocrystalline Solar Panel. This manual contains safety and installation information for Nature Power Monocrystalline Solar Panels. Nature Power reserves the right to make changes to the product, specifications and this manual without notice. Therefore, check the website for manual updates as necessary. www.naturepowerproducts.com

Cautions

- Never touch the end of output cables with your bare hands when the modules are irradiated. Handle wires with rubber-gloved hands to avoid electric shock
- Do not wear metallic jewelry when working on electrical equipment
- Product should be installed and maintained by qualified personnel
- Do not drop tools or other items on the glass of the solar module
- Do not scratch the back film of the solar panel
- Avoid exposing solar panels to partial sunlight or shadows. Partial sunlight can cause hot spots on the panel
- Do not pour chemicals on module when cleaning. To clean use a damp cloth do not apply excessive pressure to the cells
- Do not expose solar module to sunlight concentrated with mirrors, lenses or similar means
- Keep module away from children

Precautions when working with batteries

- Never smoke or allow a spark or flame near the batteries
- Batteries generate hydrogen and oxygen during charging resulting in evolution of explosive gas mixture. Care should be taken to ventilate the battery area and follow the battery manufacturer's recommendations
- Batteries contain very corrosive diluted acid as electrolyte. Precautions should be taken to prevent contact with skin, eyes or clothing
- Use caution to reduce the risk of dropping a metal tool on the battery. It could spark or short circuit the battery or other electrical parts and could cause an explosion
- Remove metal items like rings, bracelets and watches when working with batteries. The batteries can produce a short circuit current high enough to weld a ring or the like to metal and thus cause a severe burn
- If you need to remove a battery, always remove the ground terminal from the battery first. Make sure that all the accessories are off so that you do not cause a spark
- Only use rechargeable 12 Volt batteries, ie. Sealed Lead Acid, Deep Cycle, Gel-Cell etc.
- Use properly insulated tools only when making battery connections
- When working with batteries please follow the battery's manufacturer manual and precautions

Precautions when working with solar panels

With the incidence of sunlight or other light sources on all solar panels, a voltage appears at the output terminals of the solar panel turning it into a source of electricity. Do not make contact with the terminals when the panel is exposed to sunlight or other light sources. To avoid shock hazard make sure the solar panel is either turned over so the cells are not exposed to light or cover the cells with an opaque (dark) material such as paper/cloth during the installation process.

Nature Power Monocrystalline Solar Cells are manufactured in Germany by Bosch and Solar Panels are assembled in China.
Manual Printed in China

Precautions when working with Charge Controllers

If two or more solar panels are connected in series/parallel make sure that the sum of the short circuit current ratings of all panel strings does not exceed 80% of the charge controller's current rating i.e. 8 Amps or 28 Amps.

Package Contents:

- 1x Solar panel with EZ connect wiring
- 4x Mounting Z-brackets
- 4x Flange Bolts
- 4x Lock Nuts
- 4x Flat Washers
- 1x Battery Clamps

**280 Watt Kit: Double all quantities

Required Tools (Not Included)

- Wrench
- Hand Drill
- Pliers
- Drill Bit

Installation Overview

- Open the packaging and check to make sure that all parts have been received.
- Arrange to have on hand the proper tools to carry out the mounting installation.
- Determine the mounting location of the solar panel(s).
- Mount the charge controller within 5 feet of battery or loss of current may occur.
- Wire the battery to the charge controller and then the solar panel to the charge controller to ensure that the correct polarity is observed.
- Secure the solar panel to the desired location, solar panel must be within 20 feet of the battery, or loss of current may occur.

Selecting the correct Charge Controller

Charge Controllers may be sold separately and are required for installations of solar systems arrays that are rated 12 Watts and higher. Charge Controllers help to protect the battery(s) and solar panel(s) from harmful reverse currents, battery over charging and high wattage surges, addition protections are found on larger charge controllers. Nature Power Products offers an 8 Amp Easy-to-Connect Charge Controller (60008) and a 28 Amp Digital PWM Charge Controller (60028). You may also choose to use a non-Nature Power charge controller, however, please confirm that it is a 12 Volt DC charge controller. Also installations for non-Nature Power charge controllers may not be compatible with the EZ connect cables from the monocrystalline solar panel.

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Nature Power 8 Amp Charge Controller
is an easy to connect and easy to read charge controller with LED light indictors for battery charging **cut-in voltage 13V** and battery full **cut out voltage 14.2V**. The 8 Amp Charge Controller is compatible with solar system arrays rated up to 130 Watts.

Protections:

- Reverse Current
- Over Charge
- Low Voltage
- High Voltage surges

Nature Power 28 Amp Digital PWM Charge Controller
With Pulse Width Modulation (PWM) technology this charge controller helps to maintain a higher charging efficiency, thus maintaining a higher battery reserve and capacity than the standard on-off 8 Amp charge controller. The 28 Amp Digital PWM Charge Controller features a digital LCD display and adjustable voltage settings.

Protections:

- Short Circuit
- Low Voltage
- Overloading
- Discharging
- Reverse Current
- Discharging

Selecting the correct Battery

Nature Power does offer batteries. However, please choose a 12 Volt rechargeable battery. Do not attempt to recharge non-rechargeable batteries. 6 Volt battery configurations may also be used if connected in series (Negative to Positive). You may choose a Sealed Lead Acid battery, a Gel-Cell or a Deep Cycle 12 Volt battery. Batteries come in all different sizes, Please converse with your battery dealer for more information on which type of battery you should use for your system. Note your solar panel amperage rating when selecting your battery size.

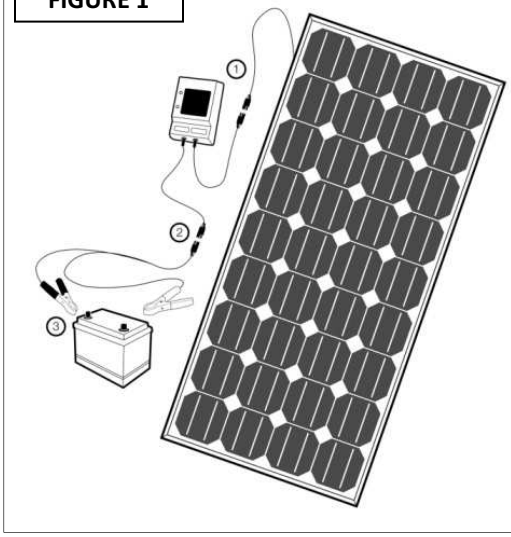
Easy Electrical Installation

Please confirm that you have all parts to your system before starting installation.

Figure 1 shows how to connect the solar panel to the 12 Volt batteries

Step 1
Connect the charge controller to the solar panel
Step 2
Connect the battery clamps to the charge controller
Step 3
Connect the battery clamps to the battery in parallel. (Parallel connections = Positive to Positive and Negative to Negative)

FIGURE 1



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Please note the installation shown is for connections to the Nature Power 8 Amp charge controller. To receive information on connections with the 28 Amp Charge Controller please refer to the 28 Amp charge controller manual.

When installing solar panels configuration and systems, please carefully observe correct cable connections and polarity. The solar panels can be damaged by not observing the correct electrical installation and polarity; in addition, this will void the warranty of your solar panel(s). Having a multi-meter handy will help to confirm correct polarities.

Extending the wiring

If you choose to mount your solar panel further away from the charge controller by extending the wiring we recommend the following gauges at each specified distance. Use stranded wire instead of solid wire. Stranded wire does not fatigue or loose connections over time.

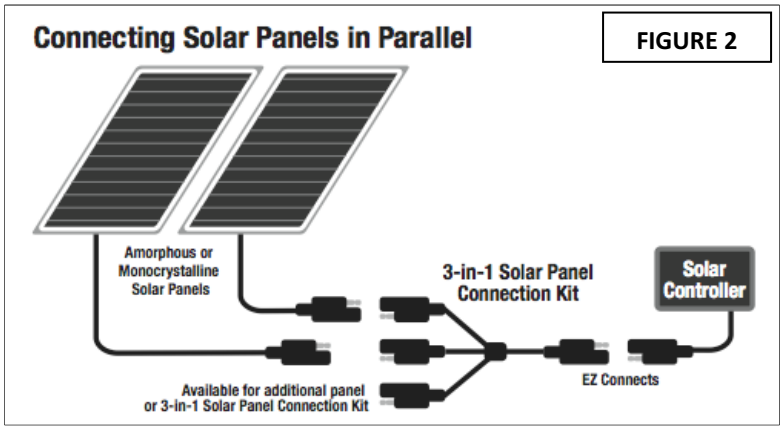
Cable Length	American Wire Gauge (size)
20-30 Feet	#12
40-50 Feet	#10
60 Feet or more	#8

To prevent loss of current we suggest mounting the solar panel within 20 feet of the charge controller and the charge controller should be installed within 5 feet of the battery.

Additional Solar Panels

You may choose to purchase additional solar panels for higher wattage and faster charging. Connecting more panels is easy with the EZ connector cables.

Figure 2 shows an example of how to connect more panels together with the EZ connector cables. If needed EZ 3-in-1 or EZ 4-in-1 connector cables are available and can be purchased from Nature Power please contact our Customer Service line to get more information on purchasing EZ connector cables.


Connecting Solar Panels in Parallel
FIGURE 2
Amorphous or Monocrystalline Solar Panels
3-in-1 Solar Panel Connection Kit
Solar Controller
EZ Connects
Available for additional panel or 3-in-1 Solar Panel Connection Kit

To order refer to item number:

90001 for the 3-in-1 connector

90004 for the 4-in-1 connector

Additional 12V DC Batteries

Addition batteries may be desired for extra electrical storage.

For 12 Volt battery bank configurations; make sure your batteries are connected in parallel (Positive to Positive and Negative to Negative)

1. From the charge controller attach the red battery clamp to the red terminal of the first battery in the bank, matching the polarities, positive to positive.

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2. Then connect the black alligator clamp to the black terminal of the second or late battery in the bank, again matching polarities, negative to negative. This will ensure an equal charging across both or all batteries.

Connecting an Inverter

An inverter can be used to converting the 12 Volt energy created to 120 Volt Electricity.
Inverter sizes and types vary depending on your power consumptions needs. Please discuss which inverter to purchase with your Inverter dealer.

Monitoring your Solar System

To confirm that your solar panels are generating power we suggest purchasing a multi-meter. Annual testing and inspections are recommended to confirm all connections are secure and panels are functioning properly.

Open voltage testing of solar panels may range from 11 Volts up to 21.6 Volts depending on the intensity of the sun, this is within normal range.

Upon annual inspections it is recommended to wipe all solar panels with a damp towel to remove dust and debris covering the panels, as layers of dust can affect the solar panel voltage.

Routine Maintenance Check List

- ✓ Check and replace damaged components if necessary
- ✓ Clean with a damp towel or cloth remove all debris
- ✓ Check and maintain the battery electrolyte levels are at regular intervals as per the battery manufacturer's recommendations if flooded wet cell lead acid batteries are used
- ✓ Check solar panel open voltage range
- ✓ Check solar panel close circuit range
- ✓ Confirm all wiring connections are secure and tight
- ✓ Confirm all mounting connections are secure and tight

Mounting

Recommendations

Choose a site for mounting the solar panels that is free from shade and located in an area that receives maximum sunlight daily. For maximum solar power absorption throughout the day, a tilt-mounting kit is recommended. Nature Power offers a 40 degree tilt-mounting kit that is sold separately. Contact Nature Power for information about the tilt-mounting kits.

The solar panels can be permanently installed level using the hardware included. If you choose not to use the included Z-brackets ensure that you create a ½ inch space between the mounting surface and the solar panel to allow for proper airflow under the solar panel.

When making connections ensure polarity is maintained, reverse polarity may cause damage and will void the warranty.

Measure the distance between the mounting site and the battery location. The charge controller should be mounted in close proximity to the battery bank (within 5 feet). Refer to the DC electrical wire guide to choose an appropriate gauge wire for the length of the wire.

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If you choose to mount your Solar Panel to your RV, be sure you solidly mount your panels to the roof. If you have a rubber roof over thin plywood you may want to use molly fasteners to get a better grip. If you have a fiberglass roof, drill some pilot holes through the fiberglass to reach plywood below. This will prevent cracking or damaging the fiberglass. If your RV is equipped with a metal roof you must mount the solar panel to the joists supporting the roof.

Figure 3 shows an example of how the panel can be mounted with the z-brackets included.

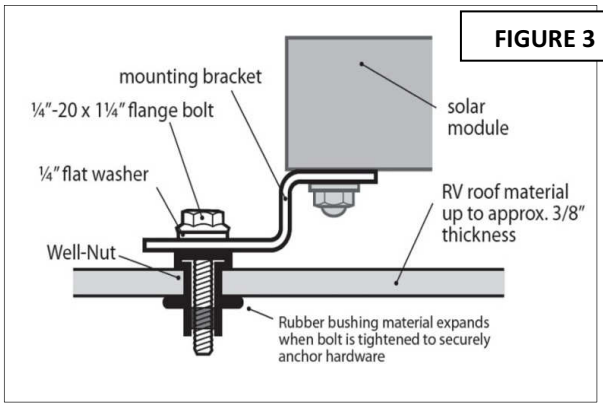
mounting bracket
¼"-20 x 1¼" flange bolt
¼" flat washer
Well-Nut
solar module
RV roof material up to approx. 3/8" thickness
Rubber bushing material expands when bolt is tightened to securely anchor hardware

FIGURE 3

The wire from the solar panel can be routed to the interior of the RV through the roof-top refrigerator vent. In this kind of installation attempt to mount the panel near the refrigerator vent. See Figure 4.

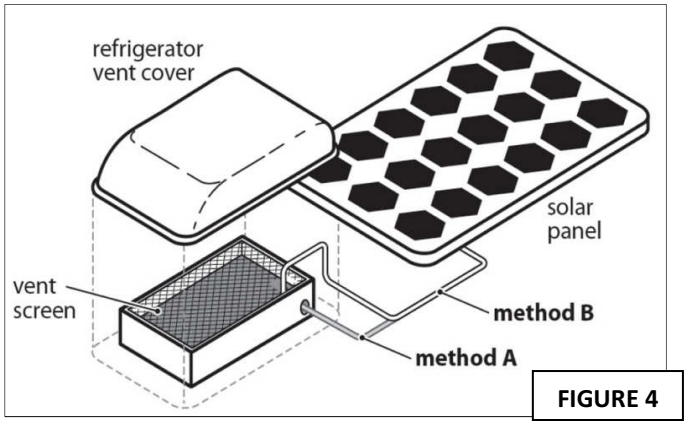

FIGURE 4

Run Times

Please refer to the runtimes chart to choose how much solar power your desired system requires. Note that all runtimes and ratings are approximate and may vary depending on your location and time of day and are based on 7 Hours of full sunlight a day.

Rated Hourly (Maximum output)	**40 Watt**	**65 Watt**	**85 Watt**	**140 Watt**	**280 Watt**
	2.29 Amp	4.86 Amp	3.71 Amp	8.0 Amp	16.0 Amp
Weekly Output	1960 Watts / 112.2 Amps	3185 Watts / 238 Amps	4165 Watts / 181 Amps	6860 Watts / 392 Amps	13720 Watts / 784 Amps
Weekly Run Times					

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Laptop (20-50 watts)	39 Hours	63 Hours	83 Hours	137 Hours	274 Hours
PC (80-150 watts)	13 Hours	21 Hours	27 Hours	45 Hours	90 Hours
Television 19" Color (70 watts)	28 Hours	45 Hours	59 Hours	98 Hours	196 Hours
CD Player - Radio (35 watts)	56 Hours	91 Hours	119 Hours	196 Hours	392 Hours
Fan (10-50 watts)	39 Hours	63 Hours	83 Hours	137 Hours	274 Hours
Halogen Light (100 watts)	19 Hours	31 Hours	41 Hours	68 Hours	136 Hours
Fluorescent Light (40 watts)	49 Hours	79 Hours	104 Hours	171 Hours	342 Hours
Coffee Maker (800 watts)	2 Hours	3 Hours	5 Hours	8 Hours	16 Hours
Portable Heater (1500 watts)	1 Hour	2 Hours	2 Hours	4 Hours	8 Hours

Electrical Ratings

Rated electrical characteristics are within +10 percent of the indicated values of Isc, Voc, Pmax under Standard Test Conditions (irradiance of 100 mW/cm², AM 1.5 spectrum, and a cell temperature of 25°C {77°F}).

The electrical characteristics are based on the results of outgoing test.

Pmax	40W	65W	85W	140W	280w
Voltage at Pmax (Vmp)	17.5V	17.5V	17.5V	17.5V	17.5v
Current at Pmax (Imp)	2.29A	3.71A	4.86A	8A	16A
Open-Circuit Voltage (Voc)	21.6V	21.6V	21.6V	21.0V	21.0V
Short-Circuit Current (Isc)	2.47A	4.01A	5.25A	8.64A	17.28A
Dimension	24x20x2.1”	26.5x25.1x1.2”	32.6x26.5x1.2”	50.9x26.5x1.3”	2x50.9x26.5x1.3”
Efficiency	18.4%	17.1%	18.2%	17.20%	17.2%
Cell technology	Monocrystalline	Monocrystalline	Monocrystalline	Monocrystalline	Monocrystalline
Class	A	A	A	A	A
Weight	8.81lbs	18.9lbs	21.1lbs	25.3lbs	(2) 25.3lbs

Under normal conditions, a photovoltaic module may experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. Modules should be multiplied by a factor of 1.25 when determining **component voltage ratings, conductor** capacities, fuse sizes and size of controls connected to the module output. Refer to Sec. 6908 of the National Electric Code for an additional multiplying factor of 125 percent (80 percent of rating) which may be applicable.

Please refer to Section 690-8 of the National Electrical Code for an additional multiplying factor of 1.25 which may be applicable.

Return Policy

If you are experiencing any problems with your unit, please contact our customer service department at 1-800-588-0590 before returning product to retail store. After speaking to a customer service representative, if products are deemed non-working or malfunctioning, the product may be returned to the purchasing store with 30 days of original purchase.

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If such a unit is returned more than 30 days but less than the one year from the purchase date, the manufacturer will repair the unit or, at its discretion, replace it, free of charge. A unit may be replaced with a new unit of the same or comparable design. The replaced unit will then be warranted under the terms of the remainder of the warranty period. The customer is responsible for the shipping charges on all returned items.

Limited Warranty

Proof of purchase required (Please keep receipts)

Monocrystalline Solar Panels

Covered by a 25 Year Limited Power Warranty

The limited warranty on the power output, guarantees that your solar unit will produce a minimum of 80% of the original rating for the warranted period from the purchase date.

The limited warranty program applies to the original purchaser of the unit only from a Nature Power authorized dealer. The warranty does not extend to subsequent purchasers or users.

One Year Limited Warranty

This warranty is limited to no other than those described herein. Any implied warranty of merchant ability of fitness for a particular purpose on this unit is limited in duration to the duration of this warranty. The solar module is warranted, to be free of defects in materials and workmanship for one year from the date of purchase without additional charge.

Nature Power will not be responsible for any amount of damage in excess of the retail purchase price of the unit under any circumstances. Incidental and consequential damages are specifically excluded from coverage under this warranty. The solar panel is not intended for commercial use. This warranty does not apply to damage to units from misuse or incorrect installation/connections. The warranty does not cover any modules connected to the solar panel. The warranty does not apply to damage from hail, floods, tornados, typhoons, hurricanes or other excessive weather related damage. Panels are weather resistant with tempered glass; however in extreme conditions precautions should be taken by the user to protect materials. The warranty does not cover misuse including wiring or connecting to improper polarity power sources. The warranty does not apply to damage to the accessories including battery clamps and mounting equipment.

Customer Service: 1-800-588-0590
Email: Info@naturepowerproducts.com
Website: www.naturepowerproducts.com

Scan me for more information

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